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November 19, 1963

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By Authority of ______ Date 8-28-7_
By ______

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Attention: Mr. C. A. Keller, Director
Production Division

Gentlemen:

Information on Fluorocarbons

Attached is the information you requested on November 6 from Mr. A. de la Garza on the inventory requirements and usages of the major relatively heavy fluorocarbons utilized as coolants, lubricants, or plastics at the Oak Ridge Gaseous Diffusion Plant. The estimates of inventory requirements and usages were made by our Production Division from various historical sources, and the commentary was reviewed by our Technical Division.

We shall be pleased to provide you with further information you may require on this subject.

Very truly yours,

R. G. Jordan, Superintendent
Oak Ridge Gaseous Diffusion Plant

PLANT RECORDS K-1034

RGJ-AG:fw

cc:
Mr. C. A. Keller, USAEC (6)
Mr. A. P. Huber
Mr. D. M. Lang
Mr. J. P. Murray
Mr. K. E. Rapp, Jr.
Mr. G.T.E. Sheldon
Mr. S. S. Stief
Mr. R. A. Walker
Plant Records (RC)
File

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Classification changed to (level and category) 15 Sep 95 Date
ADC or ADD signature (first reviewer) 9/5/95 Date
ADD signature (final reviewer) Date

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[redacted]

Union Carbide Nuclear Company, Oak Ridge Gaseous Diffusion Plant, Operating Contractor for the U.S. Atomic Energy Commission.

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This document has been approved for release to the public by:
W A Sellers 9/13/95
Technical Information Officer Date
Oak Ridge K-25 Site

KC-693

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by authority of: JD MCGAUGH JR 9/5/95
CG-PGD-4 Classification Specialist MMES

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or ______________________________;
(Official declass. notice memo, TIC notice, etc.)

W. S. Acton 9/6/95;
(Person making change) (date)

A. L. Thornton 9/6/95;
(Document identification verified by) (date)

Table 1

DATA ON FLUOROCARBONS USED AT
THE OAK RIDGE GASEOUS DIFFUSION PLANT

Item	Classification	Formula	Molecular Weight	Year First Used	Process Inventory (Pounds)	Usage (Pounds Per Mo.)	Where Used
C-816	Coolant	C_8F_{16}	400	1944	1,800,000	4,000	K-25,27
C-437	Coolant	$C_4Cl_3F_7$	287	1956			K-25,27
C-114	Coolant	$C_2Cl_2F_4$	170	1950	4,300,000	16,000	K-29,31,33
C-2144	Lubricant	$C_{21}F_{44}$	1088(ave.)	1944	See Commentary	70	K-25
MFL	Lubricant	$(CF_2=CFCl)_n$	770(ave.)	1945	600	300	K-25,27,29,31,33
MFP	Plastic	$(CF_2=CFCl)_x$	300,000	1945	See Commentary	50	K-25,27,29,31,33
Teflon	Plastic	$(C_2F_4)_x$	High	1946		25	K-25,27,29,31,33
C-716	--	C_7F_{16}	388	1944	See Commentary	--	K-25

Commentary
for Table 1

C-816: This was the process coolant of the original K-25 and K-27 plants. The original order in 1944 was for 2,250,000 lbs. It was made by both Hooker Electrochemical Company and Du Pont. About 1,800,000 lbs. were required to fill up the coolant systems in K-25 and K-27. Early usage was at the rate of about 7500 lbs. per month.

C-437: This process coolant was made on order when the C-816 stock on hand was running low (1956). It replaced the original C-816 and was made to be miscible with the C-816 already in use; the K-25 and K-27 plants today contain a mixture of C-816 and C-437 in their coolant systems. The Halocarbon Products Corporation made the needed supply of C-437.

The total present inventory of C-816 and C-437, both inside the K-25 and K-27 coolant systems and in storage, is about 2,100,000 lbs.

C-114: This process coolant is adapted to the evaporative type coolant systems in the newer axial plants, K-29, K-31, K-33. This material goes commercially under different names; it is Du Pont Freon-114, Carbide Ucon-114, Penn Salt Isotron-114, General Chemical Genetron-114.

The C-114 inventory of 4,300,000 lbs. in the coolant systems is broken down as follows:

K-33: 3,100,000 lbs.

K-31: 900,000 lbs.

K-29: 300,000 lbs.

The total present inventory of C-114 is also close to 4,300,000 lbs. Since this material is quickly available in tank car lots from commercial suppliers, quantities in storage are held to a minimum.

C-2144: This was a lubricant of limited use on equipment with possible exposure to small amounts of UF_6 and F_2. It was mainly used on external moving parts of the pumps in the original purge buildings (K-312). The original order in 1944 was for 7,050 lbs., and by 1951, this supply was exhausted. MFL has been substituted for C-2144.

MFL: This is a generally used lubricant in the presence of severe exposure to UF_6, F_2, ClF_3. It finds process plant use in large mechanical vacuum pumps and gate valves. The original order in 1945 was for 12,000 lbs. This order was made on the basis of MFL use in cold trapping operations in K-25, but these operations were quickly curtailed. MFL is now available commercially under the names

Minnesota Mining Kel-F No. 10, Halocarbon Products Corporation heavy oil 14-25, Hooker Electrochemical T-45.

MFP (also called P-10):

This is a plastic polymer made from a completely halogenated monomer for use in valve seats and gaskets having exposure to UF_6, F_2, ClF_3. It is now available from Minnesota Mining as one of the Kel-F plastics.

The plant requirements of the above plastics cannot be well ascertained. The original K-25 plant was equipped with rubber seated gate valves. Shortly after start-up, about a thousand of these valves, mainly unit valves ranging in size from 6" to 16" diameter, were equipped with P-10 seats. About 10,000 lbs. of P-10 were purchased at the time. However, during this early period, P-10 was also made locally, and it is believed that another 10,000 lbs. of P-10 were thus made. During these operations, in addition to the valve seats, a variety of beakers, tubing, flanges, etc., were made from P-10 in the local plastic shop to fill the needs of other AEC contractors, and the distribution of P-10 usage cannot be ascertained. Valves for the newer plants were purchased with P-10 seats already installed.

Teflon: This is another plastic with similar uses as MFP. It is a Du Pont product.

C-716: This was a liquid fluorocarbon material originally intended to serve as a hydrodynamic simulator of gaseous UF_6 for test purposes in the initial K-25 start-ups. About 46,500 lbs. were purchased. Actually, little use was made of it as originally intended. It later found use as a coolant in UF_6 separation pilot plants.

C-113: (Not included in Table I)

This is the original Du Pont Freon-113, now also available commercially from other sources. (See C-114.) It has been considered as a possible coolant for K-25 and K-27, and may find such use in the future.